lifetimes of more than approximately 150 μs for low-level infection or more than approximately 140 μs for high-level injection, or with measurable surface recombination velocities of not more than approximately 70 cm/s, or combinations thereof.

54 (Previously Presented) A semiconductor substrate comprising:

a monocrystalline silicon-containing material having a surface substantially free of oxidation; and

an organic layer having more than half of its atoms being carbon and hydrogen, wherein the organic layer is chemically bonded to the surface of the silicon-containing material, wherein an electrical property ~~is~~ selected from surface recombination velocity, carrier lifetime, electronic efficiency, voltage, device capacitance, contact resistance, and resistance of a doped region of the semiconductor substrate is changed as compared to the electrical property of the substrate in the absence of the organic layer.

REMARKS

These remarks are in response to the Final Office Action mailed May 8, 2007. Claim 13 has been amended to clarify a process of Applicants' invention. Support for the amendments to claim 13 can be found, for example, at page 22. Claim 46 has been amended to correct a typographical error. No new matter is believed to have been introduced.

I. REJECTION UNDER 35 U.S.C. §102

Claims 13, 16, 17, 21, 25-27, and 49-54 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Linford *et al.* (U.S. Patent No. 5,429,708). Applicants respectfully traverse this rejection.

Applicants respectfully direct the Examiner to Linford *et al.* at column 4, line 63, to column 5, line 59, and the issued claims, in which Linford *et al.* describes the reactive species used in the generation of the silicon substrate of Linford *et al.* None of the listed reactive species include iron or a ferrocene solution. Furthermore, Linford *et al.* describes the reaction using a peroxide. These reactions and methods do not provide a silicon substrate comprising the elements set forth in Applicants' claimed invention.

Applicants have provided evidence by Declaration as well as evidence in the specification demonstrating that the methods of Linford *et al.* do not inherently described a silicon substrate having the elements of Applicants' claimed invention. For example, the specification at page 22, line 1 (Table 6) shows that an "Alcohol-halogen solution" (e.g., a method of Linford et al.) provides silicon substrates having carrier lifetimes and surface recombination velocities different than those produced

by "Alcohol-ferrocene solution" (Applicants' method). The Examiner is respectfully directed to the last sentence of paragraph [0077] which states, "More of the silicon at the surface is bonded to the methoxy groups if a ferrocenium solution is used, and such surfaces produce longer lifetimes and lower surface recombination velocities." Linford *et al.* do not described such methodology and thus could not have obtained the silicon substrate characteristics as described by Applicants.

In addition, Applicants have previously provided a Declaration by Dr. Nate Lewis indicating that silicon substrates generated in peroxide and 1-octene does not provide a silicon substrate having Applicants characteristics. For example, producing a silicon substrate under alcohol-halogen techniques (*e.g.*, Linford *et al.*) provides a silicon substrate having different lifetimes and recombination velocities compared to a silicon substrate produced by alcohol-ferrocene as described by Applicants.

Accordingly, merely carrying out the method of Linford *et al.* do not provide silicon substrates the have Applicants' claimed characteristics. In fact, the data presented in Table 6 of the specification and in the Declaration provided on February 2006, demonstrate that Applicants' claimed invention does not necessarily flow from the teachings of Linford *et al.* Applicants respectfully submit that *inherency may not be established by probabilities or possibilities*. Applicants have provided data that demonstrates Applicants' invention does not "*necessarily*" flow from the teachings of Linford *et al.* As evidenced in the Declaration, attaching an organic layer to a silicon surface does not inherently result in a structure having improved electrical properties. In particular, the Declaration presents data showing that organic layers attached to a silicon surface actually do not result in the claimed invention as

suggested by the Examiner. Thus, Linford *et al.* cannot anticipate the claimed invention.

The Examiner cites to *Kalman v. Kimberly-Clark Corp.*, (713F.2d 760,772, 218 USPQ 781,789 (Fed. Cir. 1983)) for the statement that the "law of anticipation does not require that the reference teach what the appellants are claiming, but only that the claims on appeal "read on" something disclosed in the reference." Applicants submit that the claims to not "read on" what is disclosed by Linford *et al.*, because Linford *et al.* do not described actually, or via inherency, nor does Linford *et al.* suggest the silicon substrate characteristics being claimed by Applicants.

In summary, the Office Action rejections over Linford *et al.* as inherently anticipating the pending claims is in error. Under the doctrine of inherence, the teachings of the cited references much necessarily give rise to the claimed invention. Applicants have demonstrated that the claimed invention does not necessarily flow from the teachings of Linford *et al.*

Claims 13, 16, 21-24 and 49-52 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Bansal *et al.* (J. Am. Chem. Soc., 118:7225-7226, 1996). Applicants respectfully traverse this rejection.

Banal *et al.* do not describe or recite an alcohol-ferrocene solution as set forth in Applicants' claim 13 (upon which the remaining claims depend).

Accordingly, the rejection may be properly withdrawn.

II. REJECTION UNDER 35 U.S.C. §103

Claims 1, 4, 5, and 44-48 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Stengl *et al.* (USP 5,360,759) in view of Linford *et al.* (USP 5,429,708). Applicants respectfully traverse this rejection.

Neither Stengl *et al.* nor Linford *et al.* teach or suggest the characteristics of the silicon substrate as set forth in Applicants' claims. As discussed above, merely contacting a silicon substrate with an organic layer does not result in a silicon substrate having the characteristics claimed by Applicants.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Respectfully submitted,

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